



Joint Survivability Experiment with NAVAIR

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US Army Ground Vehicle Survivability Symposium
11-14 April 2005
Monterey, CA

UNCLASSIFIED

TARDEC
U.S. ARMY TANK AUTOMOTIVE RESEARCH DEVELOPMENT AND ENGINEERING CENTER

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

Report Documentation Page

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Collaborating Partners

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SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

US Army Research, Development, and Engineering Command (RDECOM)

Tank-automotive Research, Development and Engineering Center (TARDEC)

Survivability, Intelligent Systems, and National Automotive Center (NAC) Ground Vehicle
Simulation Laboratory (GVSL)

Warren, MI

US Navy Naval Air Systems Command (NAVAIR)

Air Combat Environment Test and Evaluation Facility (ACETEF)

Patuxent River, MD

TARDEC

NAVAIR



Introduction and Project Scope

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SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- Requirements driven by TARDEC Survivability Technology Area “customer”
- Demonstrating and Evaluating new technology in areas of Survivability to aid soldier *Situational Awareness* and *Protection*
- Simulation environment (TARDEC Embedded Simulation System) to provide modeling for:
 - *Sensors*
 - *Countermeasures*
 - *Decision Aids*
 - *Weapons Systems*
 - *Armor*
 - *Vehicle Mobility*
 - *Human Performance Models (HPM)*
- NAVAIR to provide airborne assets for intelligence reporting and air support



Survivability Requirements

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SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

- Integrated Survivability Active Protection System (IS APS)
 - Demonstrates Platform Protection System (PPS) for Future Combat Systems (FCS) Manned Ground Vehicle (MGV)
- Commanders Decision Aid
 - Software provided by BAE Systems (Nashua, NH)
- Sensor Suite
 - Laser Warning Receiver (LWR)
 - Electro-optical / Infrared Warner (EO/IRW)
- Threat Modeling
 - AT-5 threats / Semi-automatic Command to Line of Sight (SACLOS)
 - Rocket Propelled Grenades (RPG-7)
- Countermeasures
 - Electromagnetic Armor (EMA)
 - Multifunction Countermeasure (MFCM)
 - Smoke

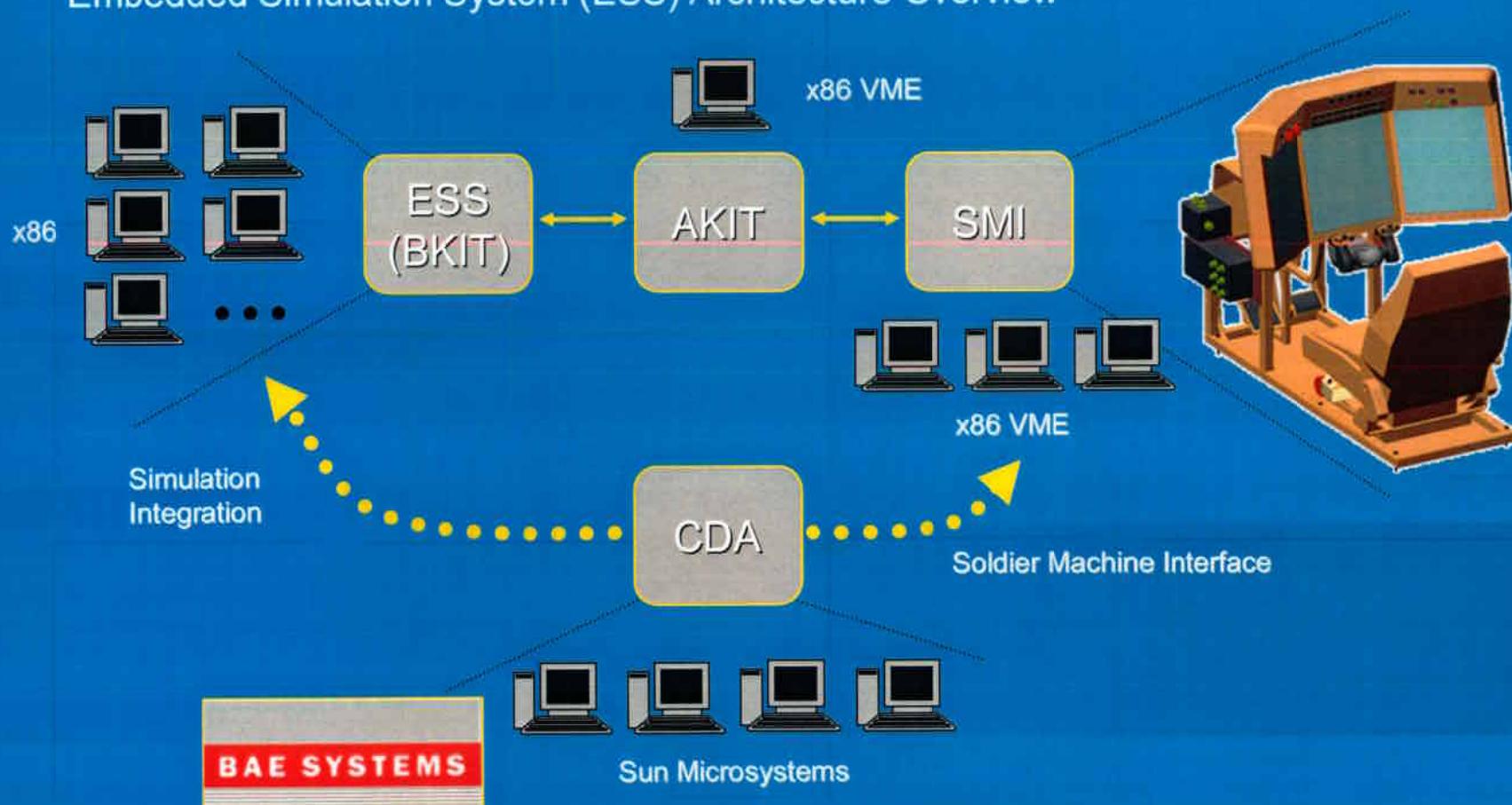


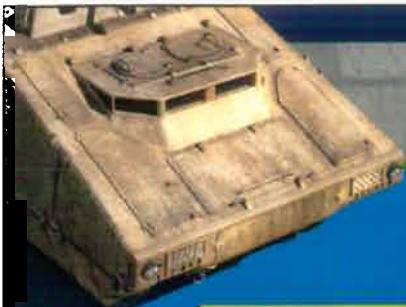
CDA Integration Effort

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TARDEC Crew Integration and Automation Testbed (CAT) Crew Station Embedded Simulation System (ESS) Architecture Overview





CDA Screen – Vehicle Protection Zones (U)

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CDA Screen – Status and Diagnostics (U)

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Zone coordination capabilities for future formation / dismounted infantry experimentation

Status					
EOW	Proc	FAIL	AP	Proc	FAIL
RR	FAIL			Tracker	FAIL
RF	FAIL			Tracker Gimbal	FAIL
LR	FAIL			Launcher	FAIL
LF	FAIL			Launcher Gimbal	FAIL
LWR	Proc	FAIL	DIRCM	Proc	PASS
RR	PASS			Laser	PASS
RF	PASS			Gimbal	PASS
LR	PASS		LSAHCM		PASS
LF	PASS		IFU		PASS
IRW	Proc	PASS	CDA	Proc	PASS
Sens	PASS			RAM	PASS
CM Modes			Active Exclusion Zone		
AP	DISABLE		NONE		
DIRCM	DISABLE				
LSAHCM	DISABLE				

Example: IRW connection detected and valid, status PASS

DIAGNOSTICS		
SYSTEM	STATUS	LINK
CDA	FAIL	FAIL
IRW	FAIL	FAIL
EOW	FAIL	FAIL
LWR	FAIL	FAIL
DIRCM	FAIL	FAIL
AP	FAIL	FAIL
LSAHCM	FAIL	FAIL

Example: If CDA cannot detect connection to simulated sensor models, Status/Link will be displayed in FAIL state



NAVAIR Integration Efforts

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NAVAIR

ENCRYPTED ATM OVER DREN



KG-75A

ATM Switch

Cisco Router

Cisco IP Switch

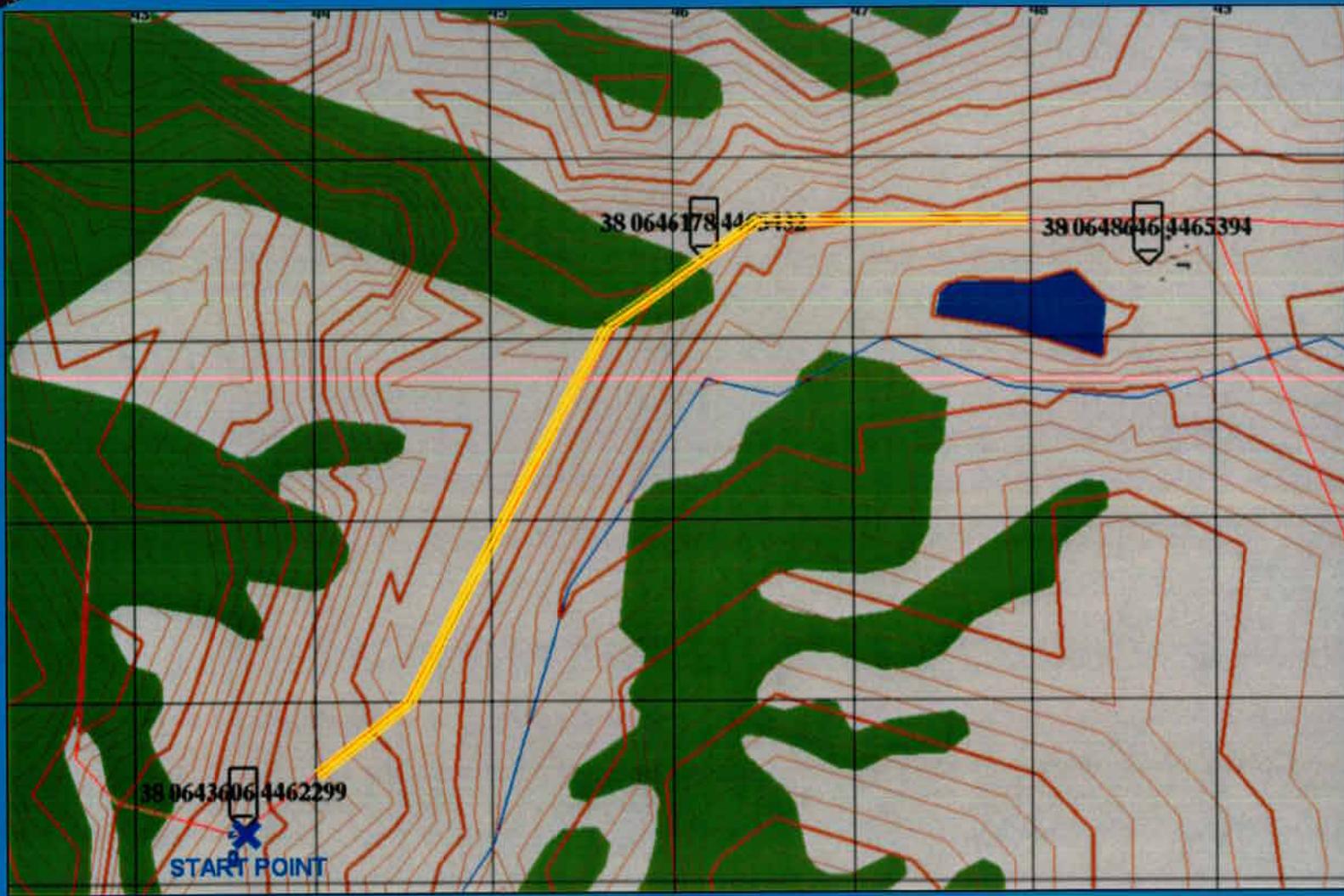
ACETEF
Classified Lab



Rural Scenario Overview

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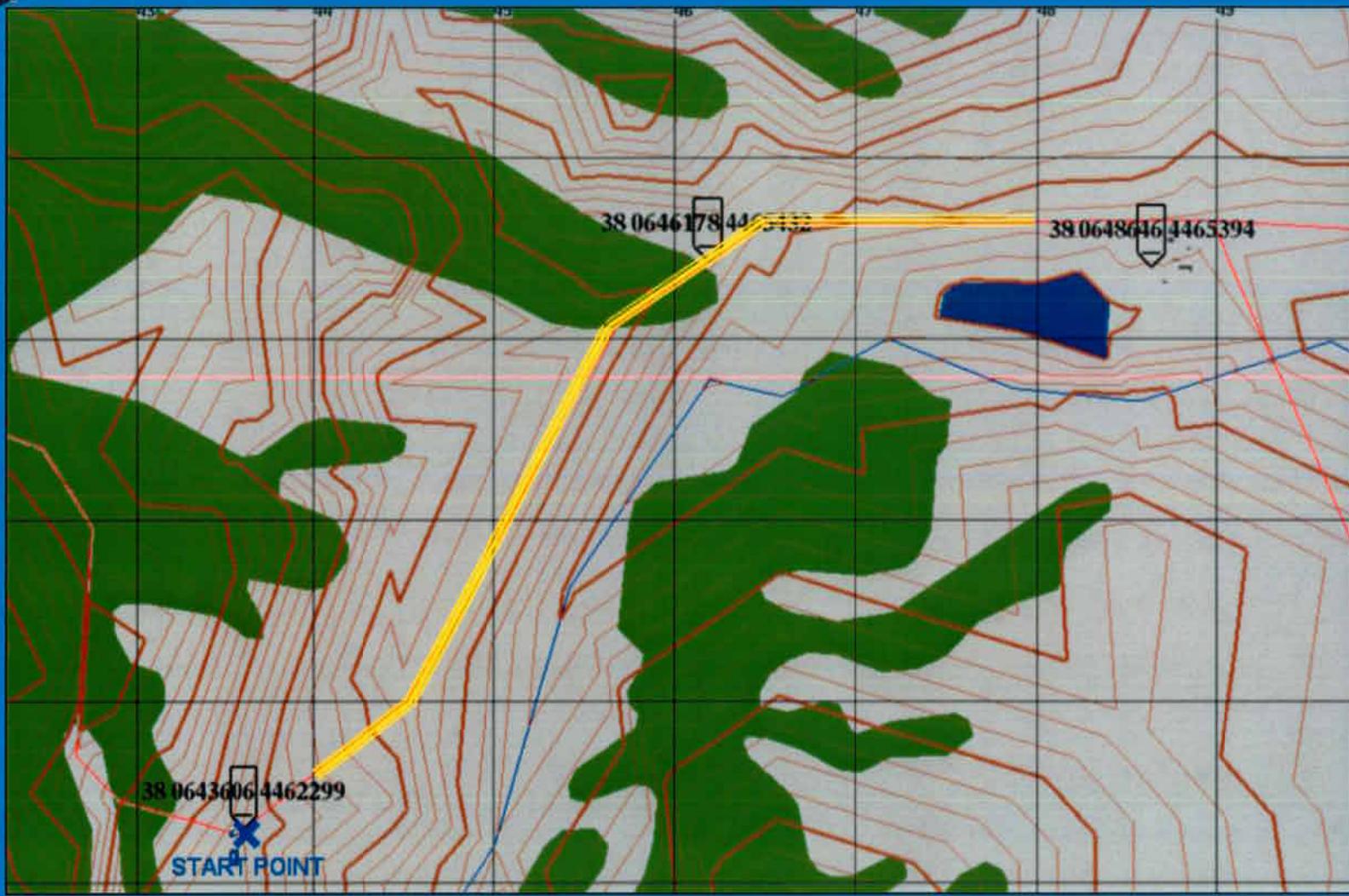




Rural Scenario Overview

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Rural Scenario OPFOR Assets

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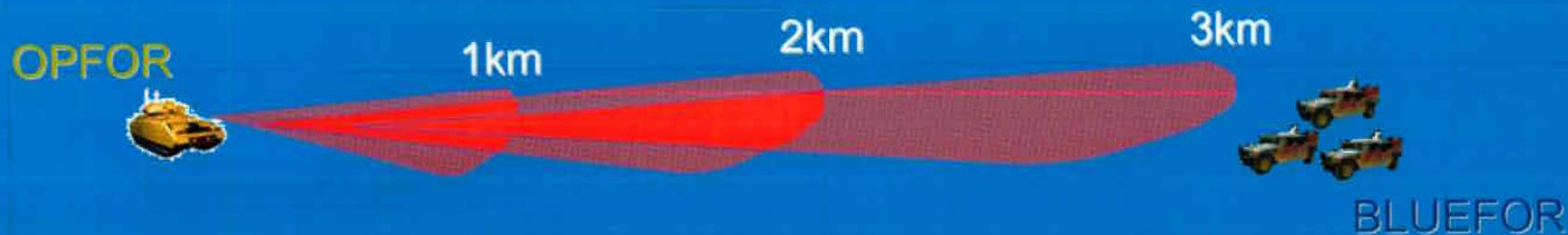


Experiment Results (on-going)

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- Signature Management Benefits
 - Increased survivability of vehicle per detection range reduction
 - Highest OPFOR defeat when detection range reduced from 3km to 2km
 - 2km to 1km range



- Other results
 - Simulation results logged for analysis
 - EMA performance
 - CDA performance
- Experiments on-going as of 04 Apr 05, further results TBD



Conclusions and Lessons Learned

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- Inter- and Intra- agency cooperation enhanced value of future technology experimentation
- Study of impact on scenario outcome with NAVAIR involvement
 - Increase in situational awareness with added intelligence
 - Increase in vehicle survivability
 - Increase in cooperation with Joint Service activity
- Programmatic
 - Experience in Stand-up of Classified experiment
 - Experience in Information Systems and Lab Physical Accreditation for desired classification levels
 - Experience in developing network infrastructure for classified communication



Questions?

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Thank You

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